

## Desired Future Habitat Conditions In Pool 10, Mississippi River

### *Description Of Pool 10*

Pool 10 is an impoundment of the Mississippi River resulting from the construction of Lock and Dam 10 as part of the 9 foot channel navigation project. Construction of lock and dam 10 was completed during 1937. Pool 10 encompasses 39,863 acres, from approximately river mile 615 near Guttenberg, Iowa, north to river mile 648, near Harpers Ferry, Iowa. In general, the east and west boundaries of the pool 10 planning area are the I & M Rail Link railroad on the Iowa/Minnesota side and the Burlington Northern Santa Fe railroad on the Wisconsin side of the Mississippi River.

Typical of most navigation pools of the Upper Mississippi River, the water to land ratio changes from south to north. The lower reach of the pool is primarily open water stretching from river miles 615 - 619. However, the lower portion of pool 10 contains more islands than similar areas in other pools within this reach of the river. The amount of land increases in the middle portion of the pool, with more islands separated by multiple river channels and backwater wetlands. The upper reach of pool 10 is predominately forested uplands, with many small river channels and shallow wetlands throughout.

Major tributaries to the Mississippi River within pool 10 are the Yellow River (IA side R.M. 638), and Wisconsin River (WI side R.M. 631). The land use within the Yellow River watershed is predominantly agricultural. Upland runoff and stream flows within watersheds such as the Yellow River typically contribute significant suspended sediment loads to the Mississippi River, particularly during high precipitation events. The Wisconsin River is one of the larger tributaries to the Upper Mississippi River. The delta formed by the Wisconsin River has encroached into the Mississippi River flood plain so that the total flow of the Mississippi River is constricted into a single channel approximately 350 yards wide.

Although privately owned lands exist within the pool 10 Mississippi River flood plain, primarily near adjacent towns, most of the flood plain is owned by the Federal Government and managed as part of the Upper Mississippi River National Wildlife and Fish Refuge.

### *Pool 10 Sub-Area Names*

Several identifiable areas are present within pool 10. The boundaries of these area can be roughly defined based on hydrologic units (i.e. main channel, tributary deltas or bluffs). The following areas have been delineated to facilitate presentation of desired future habitat conditions in the pool:

**Harper's Slough**, river mile 641-648 – Bounded on the west by the railroad, on the east by the main channel, on the north by Lock and Dam 9 and on the south at the confluence of Harper's Slough and the main channel. The pre-lock and dam construction Harper's Slough complex spanned much of what is now lower pool 9 and upper pool 10. In what is now the pool 9 portion, all trees were removed and most land and water features were submerged by river impoundment (north of dam 9). The pool 10 portion of the Harper's Slough complex is typical of most upper pool habitats. Predominant features include forested islands, with many backwater lakes and marshes. Secondary and tertiary river channels flow through the area, the largest being Harper's

Slough, which flows along the western boundary of the area. One spillway in Dam 9, on the historic Harpers Slough, and several side channels entering from the main channel provide water flow through the area.

Major habitat concerns for the area include excessive sedimentation rates of backwater areas, excessive shoreline erosion, decreased productivity of aquatic and upland habitats.

This complex of backwaters also includes a small complex on the Wisconsin side of the main channel locally called Bachelor's Pond and Gordon's Bay (river mile 646-647). This is a small backwater area bounded on the east by the main channel and on the west by the railroad on the Wisconsin shore. Resource problems in this area include sand deposition and increased flows into Gordon's Bay as a result of island erosion and fine sediment deposition in Bachelor's Pond. This adversely affects fishery habitat quality.

**Ambrough Slough/Gremore Lake**, river mile 636 - 643 – Bounded on the west by the main channel, and on the east by the BNSF railroad or the eastern most backwater shore line. The northern boundary is a point along the Wisconsin shore near river mile 643. The southern boundary is the confluence of Rosseau channel and East channel.

This is a backwater complex of primarily forested uplands, backwater lakes and marshes. Two backwater channels, Ambrough Slough and Black Slough, which enter from the main channel on the areas north and west side, respectively, are the primary sources of water flow through the area.

Major habitat concerns include increased sedimentation of backwater channels and wetlands and decreased productivity of aquatic habitats.

**McGregor Lake/East Channel**, river mile 633 - 636 – This area is a mid-river island, backwater pond, small channel complex. It is bounded by East Channel on the east and south sides, on the north by the junction of East Channel and main channel, and on the west side by the main channel.

Excessive sedimentation and long-term static water levels have decreased productivity of the aquatic habitats for fish and water birds. The narrow island that separates McGregor Lake from East Channel is subject to excessive erosion. A breach of the island would allow East Channel flow through McGregor Lake.

**Gerndt Lake/Wisconsin River Delta North**, river mile 631 - 633 – This area is an island/backwater wetland complex within the Wisconsin River delta north of the main stem of the Wisconsin River, including Hunter and Indian Isle in the northern portion of the area. The area is bounded on the east by the river shore on the Wisconsin side and road grade of the Burlington Northern Santa Fe railroad, on the north by the East Channel, on the west by the Main Channel and on the south by the Wisconsin River.

Excessive sedimentation and long-term static water levels have adversely influenced the backwater lakes within Hunter Island and Indian Isle.

The Wisconsin River and its terminal delta at the confluence of the Mississippi River greatly constricts the Mississippi River channel. The Wisconsin River carries a substantial sand bedload. This delta is the northern demarcation of a relatively narrow Mississippi River valley due to the erosion resistant limestone and dolomite formations through which the river flows.

**Glen Lake/Wisconsin River Delta South**, river mile 628 - 631 – This area is the southern portion of the Wisconsin River delta, composed of forested upland, old channels of the Wisconsin River and backwater lakes and marshes. The bounds of the area are the main stem of the Wisconsin River on the north, the railroad grade on the east, and Mississippi main channel on the west and south. This area is used extensively used by migrating songbirds. Aquatic habitat in this complex is mainly influenced by water quality and sediment delivery from the Wisconsin River. Some of the channels in this complex have suffered from sand deposition. A

**Methodist/Norwegian Slough**, river mile 625 - 630 – This area is bounded on the west by the I&M Rail Link rail road, and on the north, east and south by the Mississippi River main channel. This is a mid-pool complex of forested islands, backwater lakes and marshes, intersected by several secondary and tertiary side channels. The largest side channels include Johnson Slough, which enters from the main channel near river mile 630 and flows through the area, joining Wylusing Slough near the confluence of Sny McGill Creek. Wylusing Slough enters the area near river mile 627.5, joins Johnson Creek, then continues through the central portion of the area before rejoining the main channel near river mile 625.

Several backwater lakes within the area have deeper water portions that provide very good winter fish habitat.

**Bagley Bottoms/Jays Lake**, river mile 621 - 627 – Bounded on the east by the Burlington Northern Santa Fe railroad on the east, the main channel and State Line channel on the north and west, and Sandy Creek on the south. Bagley Bottoms is a large forested upland, old side channel, backwater wetland complex. Wetlands include several larger shallow lakes; including, Gassner, Glass Havle, Ferry, and Hoosier Lakes. The Jays Lake and an associated area of open water with scattered islands and side channels occupies the southern portion of this general area.

Similar to many backwater lake areas along the Mississippi River, the lakes and other shallow wetlands of the area are experiencing reduced habitat productivity/suitability for many fish and wildlife species because of excessive sedimentation, island erosion and long term static water levels.

**French Island/Duck Lake**, river mile 619 - 623 – Bounded by the main channel on the west, the junction of State Line Slough and main channel on the north, and the junction of State Line/Cassville Slough and main channel on the south, and Burlington Northern Santa Fe railroad on the east. This area occupies the northern portion of lower pool 10. It is a complex of linear islands, adjacent shallow marshes, side channels, and increased open water areas. The largest backwater lakes include, Duck, Jimore and Otis Lake. State Line Slough is a large channel of the Mississippi River that departs from the current main channel at river mile 624 and flow through the central and eastern portion of this area.

Excessive sedimentation in back water areas, including lakes and channels, and loss (erosion) of islands are among the major problems of the area.

**Frenchtown Lake/Bussey Lake**, river mile 615 - 621 – This area is bounded by the main channel and west shore of Abels and Esman Island on the east, and I&M Rail Link railroad on the west. An access road from the Iowa side of the river to Abel Island bisects the area.

Abel and Esman Islands, now joined as one island, are privately owned. The area is extensively developed with single family, recreation and full time, cabins and homes.

Frenchtown Lake is a major feature of the northern portion of the area. Buck Creek enters the Mississippi floodplain and flows into Frenchtown Lake. Buck Creek's terminal delta, a complex of lowland forest and marsh is the major landscape feature between the Abel Island access road and Frenchtown Lake.

Fishery resources in Frenchtown Lake have deteriorated to the point of being non-existent due to excessive sedimentation in this backwater lake.

A portion of Buck Creek flows south through a water control structure beneath Abel Island access road. This structure was constructed as part of the Bussey Lake HREP. The structure supplies/controls consistent, low volume water flow to benefit the winter fishery in adjacent Bussey Lake.

Bussey Lake occupies the southern portion of this area. Bussey Lake is the site of a completed EMP/HREP project, completed in 1995. Project features included dredging and improving winter water flow within Bussey Lake to improve winter habitat for fish.

**Lower Pool 10**, river mile 615 - 619 – Bounded by the Burlington Northern Santa Fe railroad on the east, the northern portion of Cassville Slough on the north, the main channel and eastern shore of Abel Island on the west, and Lock/dam 10 on the south. This area is the southern most portion of pool 10. The prominent landscape features include a complex of relatively slender, linear and horseshoe shaped islands within the broad open water expanse typical of this portion of most navigation pools. The physiography of lower pool 10 is notable in that more islands remain, compared to other pools in the Upper Mississippi River. However, the remaining islands have been/are subject to excessive erosion because of river currents and wind caused wave action. Current and wave action and resultant sediment transport subject the area to excessive water turbidity and sedimentation. These factors adversely affect emergent and submerged vegetation in the area.

### *Unique Attributes, Opportunities and Constraints*

A predominant characteristic of pool 10 is the series of backwater channel/lake/forested upland complexes that occupy northern two thirds of the pool. Though the proportion of open water increases in the southern (lower) one third of pool 10, a significant number of islands persist to lock and dam 10. These areas provide opportunity to improve, restore habitats more typical of an unimpounded river; such as, improving/restoring backwater wetlands for fish or water birds, improving connectivity of aquatic habitats, manipulating water levels to benefit wetland and upland habitat, and increasing upland elevations to improve forest diversity.

The geologic features of pool 10 generally limit disposal of dredged sediment to areas within the floodplain. Removal of dredged materials is typically accomplished by special projects such as at Macmillan where stock piled dredged materials were hydraulically removed from the floodplain.

### *Summary of Potential Actions to Achieve Desired Future Habitat Conditions*

Many of the proposed actions are interrelated. Often solutions to problems will require implementation of more than one action. Likewise, single actions may address more than one

problem. The over arching goal of these actions is to increase the productivity of the river ecosystem using all feasible means.

**1.) Maintain existing quality habitats.**

A key to the desired future is to protect and maintain existing terrestrial and aquatic habitat. Many areas in Pool 10 are considered as quality habitat for a variety of species. Maintenance of existing quality habitat may be as simple as leaving it alone and monitoring it's condition. Specific actions would be identified if long-term declines in habitat quality in the area are noticed.

**2.) Support watershed management.**

Agencies involved with resources on the Mississippi River should cooperate with the State of Wisconsin and other agencies involved in management issues on the Wisconsin River, the largest tributary to the Mississippi River in pool 10 and a major contributor of sand (bedload) to the Mississippi River system. The Yellow River and several other small streams, such as Sny McGill empty into pool 10. Though these smaller rivers contribute proportionately less sediments and pollutants, they suffer from adverse watershed management issues and cumulatively add significant sediment and excess nutrient loads to the Mississippi.

**3.) Manage water levels to improve aquatic habitat.**

Construction and operation of the commercial navigation project on the Upper Mississippi River has drastically altered water levels and flow regimes. Although benefiting some species, particularly after initial closure of the dams, many fish and wildlife species were adversely affected. Continued static, relatively higher water levels have decreased river productivity.

Periodic water level drawdowns will increase light penetration and expose some areas normally inundated. This will promote the growth of emergent and submergent plants. Long term inundation has resulted in the loss of aquatic plant growth in many areas of pool 10.

**4.) Protect and restore islands.**

Unlike many other navigation pools, existing islands are distributed throughout pool 10. This feature provides the benefit of high habitat diversity. Maintaining or enhancing existing islands throughout pool 10 will maintain the productivity of this area.

**5.) Increase depth diversity in channels and backwaters.**

Flood plain structure will be restored and enhanced in the French Island/Duck Lake, and Lower Pool 10 areas. Measures to reduce sediment resuspension in these areas will reduce sediment input to lower pool 10 and Upper Pool 11. Reduction in sediment resuspension will also improve environmental conditions for the establishment and maintenance of aquatic vegetation. Projects in these areas will also improve habitat diversity and quality through the promotion of secondary and tertiary channel development and diversification of water velocities in the open water reach. The desire is to convert a significant portion of area currently classified as impounded into contiguous backwaters

**6.) Manage river flows and connectivity to improve aquatic habitat.**

Flow regimes in numerous areas have been greatly altered, mostly by channel maintenance structures (i.e. wingdams and closing dams). In some cases the structures can be removed or modified to promote diverse flow patterns without damaging navigation priorities. In other areas habitat will be benefited by reducing or eliminating flows. A review of all structures within pool 10 should be initiated to determine how they can best be compatible with both wildlife and navigation concerns.

Projects will be implemented in the Harpers Slough, Ambrough Slough, McGregor Lake, Gerndt Lake/ Wisconsin River delta/Glen Lake, Methodist/Norwegian Slough, Bagley Bottoms/Jays Lake, French Island/Duck Lake, and Lower Pool 10 areas to improve habitat for riverine and backwater communities. Measures likely to be taken include: selected dredging, closures, island restoration, shoreline stabilization and improved connectivity in selected areas.

Connectivity with pools 9 and 11 will be improved through the implementation of structures or dam operation measures to increase fish passage at these dams.

**7.) Work cooperatively with private landowners.**

Several areas within pool 10 are privately owned. Purchase of these lands from willing sellers will assure long term protection, connectivity, and ability to manage habitats within the river corridor and adjacent tributaries.

**8.) Actively manage forest and prairie communities for diversity and quality.**

Potential for terrestrial habitat maintenance and restoration exists in the Harpers Slough, Ambrough Slough, McGregor Lake, Gerndt Lake/ Wisconsin River delta/Glen Lake, Methodist/Norwegian Slough, Bagley Bottoms/Jays Lake, and French Island/Duck Lake areas. Measures to be taken will include: conversion of areas currently dominated by Reed canary grass into forest; revegetation of historic selected channel maintenance disposal sites; raising the elevations of selected land areas through the use of material dredged from adjacent backwaters to improve aquatic habitats.